SOLANA ROAD RADIATION
PONTE VEDRA, ST. JOHN'S COUNTY, FLORIDA
DRAFT ASSESSMENT AND REMEDIATION STRATEGY

Site Background

During a pre-event radiation sweep prior to a golf-tournament in Ponte Vedra, FL, the Florida Department of Transportation discovered elevated gamma radiation from a vacant lot at 7 Solana Road. Subsequent investigations by the Florida Department of Health (FDOH) and the EPA revealed gamma radiation exceeding 1000 milli-Roentgen Equivalent Man per hour (mrem/hr) at two distinct patches of soil on the property. A preliminary survey along Solana Road also suggests that additional areas with elevated radiation levels may exist, affecting other residences. A sample collected by FDOH confirmed the presence of Thorium^{232} at 80 picocuries per gram (pCi/g) and Radium^{226} at 47 pCI/g.

Historical research shows the area was mined for mineral sands, including rutile, ilmenite, and other titanium-bearing minerals during World War I. Nearby mines also extracted monazite, a thorium-containing mineral during World War II. At this time it is unknown if the radiation present at the site is part of a larger impact from historical mining operations or if the site represents a singular occurrence from an unknown source.

Study Area

The initial assessment study area extends from the intersection of Ponte Vedra Boulevard and Corona Road, runs west along Corona Road to Le Masters Road, north to San Juan Drive, north to Pablo Road, and eventually completes the boundary at the intersection of Ponte Vedra Boulevard. The area includes property on both sides of the named streets, is approximately 0.9 square miles (600 acres), and includes approximately 700 parcels comprising 510 physical residences on over 600 lots, 10 commercial properties, and 1 elementary school. At least one of the residential properties operates a day care facility. This attached figure details the proposed area and shows the various types of properties based on zoning (residential/educational vs. commercial, short-term rental, or recreational).

Assessment Goals

1. Determine if human health is at risk due to elevated gamma radiation at properties near and around the site.
2. Determine if the radiation at the site is isolated or part of a general system of 'hotspot' contamination in the Ponte Vedra area.
3. Identify the nature of the contamination, the exact radionuclides and their ratios, and their dispersion pattern through sampling.
4. To use collected data to include or exclude properties for further action based on exposure potential.
5. To provide planners with generalized action levels for commencing further response activities at properties with elevated gamma radiation exposure.

Assessment Activities

Assessment of the area surrounding the site will occur in two phases, with the second phase contingent on the results of the first.

Phase 1 will consist of using a road survey by a vehicle equipped with a large volume gamma ray detector capable of detecting gamma radiation sources from a distance, without physically entering private property. The instrument's response is proportional to the quantity and shielding of the radioactive material and its distance from the detector. This vehicle will drive the public thoroughfares and collect non-intrusive data from each property within the study area. The data from this survey will be used to

determine if the radiation at the site is part of a general system of elevated contamination throughout the neighborhood. If no elevated radiation levels are detected by this survey, EPA will assume that the radioactive materials at the site are isolated and no further action will be taken for properties not affected by the previously identified contamination.

Properties where the dose rate exceeds 30 micro rems per hour (µrem/hr), which is approximately 3x gamma background levels [roughly equivalent to 100 millirems per year (mrem/yr)], at the accessable property edge, will be targeted for inclusion in Phase 2 of the characterization. Properties indicating levels greater than 90 µrem/hr (approximately 500 mrem/year) will be given the highest priority for characterization.

Additionally, samples of the hot spots at 7 Solana Road will be collected. The samples will be used to confirm the radionuclides present as well as their ratios. EPA will also perform a subsurface investigation to determine the depth of contamination. Two biased sampling locations will be chosen that have the highest exposure rate readings. Samples taken at these locations will consist of soil on the surface (0-6"), soil at 12-18 inches, and soil at 24-30" if sampling depth does not hit water.

Phase 2 will consist of a thorough characterization of the radiation present both inside and outside structures on a property. EPA will utilize a highly sensitive, GPS-tracked gamma radiation sensor to generate a detailed map of radiation in property soils. Soil samples may be collected to determine the exact soil concentrations of each radionuclide of interest. A combination of radiation dosimetry badges and hand-held exposure meters will be used to characterize exposure levels inside buildings. A detailed sampling and analysis plan will be generated prior to mobilization of Phase 2.

Radon measurements will also be collected by FDOH under the Florida Radon Program.
From these characterizations, EPA will derive an average exposure dose for each property, based on the Superfund residential exposure of 18-hour/day (16-hour exposure inside the residence and a 2-hour exposure outside the residence).

Exposure Prioritization
Once characterization for a given property is complete, the property will be assigned to one of three tiers based on the exposure dose rate of the occupants.

- **Tier 1** – If the derived dose rate is less than 100 mrem/yr, no further investigation will be conducted under this program.
- **Tier 2** - If the derived dose rate is below 500 mrem/yr but exceeds 100 mrem/yr, further action as discussed below may be warranted on a case by case basis.
- **Tier 3** - If the derived dose rate exceeds 500 mrem/yr prioritization for further action should be given.

Remediation Possibilities
Given the likely variability in the actual dose rates, location, depth, and home construction types between various properties, applying a uniform remediation principle is impractical. Based on the factors listed above, EPA will work closely with FDOH, ATSDR, and the property owner to determine the best remediation practices for each property. EPA may recommend one or more of the following remediation approaches:

- **Bulk Removal** – High levels of contamination in open lawns near the surface may be best remediated by simple physical removal of the bulk material, followed by off-site disposal. This represents the most immediate, permanent, and certain method available. This option is available

for interior contamination, provided the residence is constructed with a crawlspace rather than a slab.

- **Shielding (Soil)** – For lower dose rates in property soils, the use of additional soil or concrete as shielding may be more practical. This approach is less intrusive, lowers remedial costs, but may leave radioactive material in place on the property. This material may impact future use and development of the property.
- **Shielding (Buildings)** – Providing shielding within structures involves the removal of the current flooring of the building and installation of protective shielding on the subfloor. This is an intrusive and costly practice, but may be the only way to adequately protect residents. Depending on the specific nature of the contamination, only some portions of the residence may require shielding.
- **Ventilation (Radon)** – If the contamination is primarily from Radon, installation of sub-slab or crawlspace ventilation systems can lower the dose rates to acceptable levels, even if other gamma sources are present. This option may be feasible in homes with lower levels of gamma radiation where the reduction in Radon can adequately lower the interior dose rate.
- **Limitations to Exposure** – For homes with only a small area of elevated indoor radiation, which manifests itself in an a relatively unused portion of the home (utility shed, pool house, garage), taking no remedial action may be warranted, provided the occupants are aware of the limitations on the areas' use and no foreseeable change in the building's use plan is evident. Likewise, for lawns with only a small patch of elevated contamination, it may be more feasible to simply avoid that section of the lawn for extended periods of time. It may be the case where there is only a small hotspot within the property, in an area that is infrequently used, and thus residential exposure in aggregate would be limited. Areas that are frequently accessed, such as gardens, play areas, or entertainment areas should not be considered for this option. However, each home should be assessed on a case-by-case basis to see if this option makes sense from a dose-exposure viewpoint. Any discussion of leaving contamination in place should be carried out with the homeowner's inclusion.

Other optional remediation techniques may involve combinations of one or more of the above-listed options, as well as the incorporation of new and innovative technologies which can be demonstrated to be protective of human health. It should be restated that a single, "one-size fits all" remediation approach is likely impractical, and the selection of any remediation technology should come only after consultation with EPA, FDOH, ATSDR, and the homeowner.

Community Relations

It is imperative that EPA work with the property owners and keep them informed during the assessment and remediation phases of this endeavor. Property owners will be provided a letter detailing the results of the Phase 1 investigation and a detailed report, including maps and calculations, for Phase 2. They will also play a considerable role in remediation selection for their property. Details on these and other activities will be thoroughly laid out in a Community Involvement Plan prior to initiation of site activities.

PROPOSED STUDY AREA
SOLANA ROAD RADIATION
PONTE VEDRA, FLORIDA